Claims

1. A packet distribution control method in multicast communication of one-to-many or many-to-many communication, said packet distribution control method comprising:

a step in which a end node that is capable of using both IP multicast and IP unicast and that joins the multicast communication checks whether or not a receiver end node of a next packet distribution destination is capable of communicating in IP multicast; and

a step in which the sender end node switches packet distribution to the receiver end node between IP multicast and IP unicast according to the check result.

2. The packet distribution control method according to claim 1, further comprising:

a step of setting a forwarding rule for each end node joining multicast communication based on a multicast distribution tree, describing an IP multicast address in the forwarding rule when a next packet distribution destination is capable of communicating in IP multicast or describing an IP address of an end node of the next packet distribution destination in the forwarding rule when the next packet distribution destination is not capable of communicating in IP multicast,

wherein the sender end node checks an address attribute described in the forwarding rule and switches between IP multicast and IP unicast.

3. The packet distribution control method according to claim 2,

wherein when other end node capable of communicating in IP multicast is present among end nodes that are roots or branches of the multicast distribution tree, packet distribution is performed on the other end node using an IP multicast packet with the IP multicast address as a destination address, while when other end node not capable of communicating in IP multicast is present among end nodes that are roots or branches of the multicast distribution tree, packet distribution is performed on the other end node using an IP unicast packet with the IP address of the other end node as a destination address.

4. The packet distribution control method according to claim 1, further comprising:

a step in which an end node joining multicast communication transmits a response request message in IP multicast to other end nodes than its own end node, with respect to which it is unclear whether or not IP multicast communication is possible, and judges an end node returning a response message in response to the

response request message as an end node capable of communicating in IP multicast.

5. The packet distribution control method according to claim 1, further comprising:

a multicast distribution tree calculating step in which a sender end node among end nodes joining multicast communication obtains a multicast distribution tree with the sender end node as a root,

wherein in the multicast distribution tree calculating step, the sender end node registers end nodes targeted for the multicast distribution tree in a list, eliminates an internal end node with which the sender end node is capable of communicating in IP multicast from the list of registration, specifies an end node that is a branch based on a distribution tree calculation algorithm from the list of registration with the sender end node as a starting point, eliminates the branch end node and an internal end node of the branch end node from the list of registration, adds the branch end node to the starting point, repeats the same processing on ahead portions from the branch end node, and thereby obtains the multicast distribution tree.

6. The packet distribution control method according to claim 5,

wherein a forwarding request message is

transmitted in IP unicast to each branch end node of the multicast distribution tree calculated based on the multicast distribution tree calculating step, the forwarding request message describing a forwarding rule that is determined for each branch, the forwarding rule describing an IP address to forward a packet when receiving the packet for multicast communication with an end node that is a root of the multicast distribution tree as a source, and the branch end node receiving the forwarding request message holds the forwarding rule in the forwarding request message as a forwarding rule of the branch end node.

7. The packet distribution control method according to claim 6, wherein in the case of detecting an end node leaving multicast communication, the multicast distribution tree is reconstructed according to a state after the end node leaves.

8. The packet distribution control method according to claim 1, wherein information of end nodes and information of join and leave of the end nodes are exchanged between a management server that manages end nodes joining multicast communication and the end nodes, and the management server manages the end nodes.

9. A communication terminal which joins multicast

communication that is one-to-many or many-to-many communication, comprising:

an IP multicast section that uses an IP multicast address in packet distribution;

an IP unicast section that uses an IP address in packet distribution; and

a switching section that switches between IP multicast and IP unicast according to a receiver end node.

10. The communication terminal according to claim 9,

wherein the communication terminal exchanges information of other end nodes and information of join and leave of the other end nodes with a management server that manages end nodes joining multicast communication.

11. The communication terminal according to claim 9,

wherein the communication terminal calculates a multicast distribution tree where IP multicast and IP unicast are both present to use both IP multicast and IP unicast for packet distribution.